

Indiana Michigan
Power Company
500 Circle Drive
Buchanan, MI 49107 1395



March 17, 2003

AEP:NRC:2573-03
10 CFR 50.73

Docket No. 50-315

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 1
LICENSEE EVENT REPORT 315/2003-001-00
UNIT 1 TURBINE AND REACTOR TRIP DUE TO
MAIN TRANSFORMER FAULT AND FIRE

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

LER 315/2003-001-00: "Unit 1 Turbine and Reactor Trip Due to Main Transformer Fault and Fire."

There are no new commitments identified in this submittal.

Should you have any questions, please contact Mr. Brian A. McIntyre, Manager of Regulatory Affairs, at (269) 697-5806.

Sincerely,

A handwritten signature in black ink, appearing to read 'A. Bakken III', written over a large, loopy flourish.

A. Christopher Bakken, III
Senior Vice President, Nuclear Operations

RAM/jen

Attachment

IE22

c: L. Brandon – Michigan Department of Health
K. D. Curry – AEP Ft. Wayne
J. E. Dyer – NRC Region III
J. T. King - MPSC
MDEQ – DW & RPD
NRC Resident Inspector
Records Center - INPO
✓ J. F. Stang, Jr. – NRC Washington DC

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Donald C. Cook Nuclear Plant Unit 1

2. DOCKET NUMBER

05000-315

3. PAGE

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4. TITLE

Unit 1 Turbine and Reactor Trip due to Main Transformer Fault and Fire

5. EVENT DATE			6. LER NUMBER				7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	15	2003	2003	—	001	—	00	3	17	2003	

9. OPERATING MODE		1		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)					
10. POWER LEVEL	100		20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
			20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
			20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
			20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
					50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER
			20.2203(a)(2)(iii)		50.48(a)(3)(ii)		50.73(a)(2)(v)(C)		Specify in Abstract below
			20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		or in NRC Form 366A
			20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
			20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
			20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)				

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Richard A. Meister, Regulatory Affairs	(269) 465-5901, x1707

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EL	XFMR	VA Tech Elin	Yes					

14. SUPPLEMENTAL REPORT EXPECTED

X	YES (If Yes, complete EXPECTED SUBMISSION DATE).	NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
X				07	11	2003

16. Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On January 15, 2003, at approximately 2010 hours, a fault occurred in the Unit 1 main transformer. The fault caused the current differential relays to actuate resulting in an automatic trip of the main transformer. A sudden internal fault within the main transformer ruptured the transformer oil tank resulting in a loss of oil and a fire. The loss of the main transformer precipitated an automatic trip of the main generator and an immediate turbine and reactor trip. The main transformer fire was extinguished within 35 minutes of the event with one minor reflash, which was promptly controlled and extinguished by onsite fire brigade members. One minor personnel injury occurred requiring offsite medical attention. An Unusual Event was declared based on a fire of more than 15 minutes in duration within the protected area. All safety-related components functioned properly and no significant discrepancies in equipment time responses were noted. In accordance with 10 CFR 50.72(b)(2)(iv)(B), 10 CFR 50.72(b)(2)(xi), and 10 CFR 50.72(b)(3)(iv)(A), all applicable event (EN #39513) and emergency plan required notifications were completed in a timely manner. As such, this LER is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A) for a condition resulting in an automatic actuation of the reactor protection system. A one-hour report was completed at 2105 hours and the remaining three reports were completed by a single notification at 2339 hours. The apparent cause of the event was a sudden internal fault within the main transformer. Corrective actions included replacement of the main transformer. Other non-safety related components damaged by the resultant fire were either repaired or replaced.

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17. TEXT (If more space is required, use additional copies of NRC Form (366A))

Conditions Prior to Event

Unit 1 - Mode 1, 100 percent power

Unit 2 - Mode 1, 100 percent power

Description of Event

On Wednesday, January 15, 2003, at approximately 2010 hours, a fault occurred in the Unit 1 main transformer (Manufacturer: VA Tech Elin, Model Number: TDQ116A20D9K-99) [EL]. The fault caused the current differential relays to actuate, resulting in automatic trip of the main transformer. A sudden internal fault within the main transformer ruptured the transformer tank and resulted in a loss of oil and a fire.

The loss of the main transformer precipitated an automatic trip of the main generator [TB] and an immediate turbine [TA] and reactor trip [JD]. The main transformer fire was extinguished within 35 minutes of the event with one minor reflash, which was promptly controlled and extinguished by onsite fire brigade members. One minor personnel injury occurred requiring offsite medical attention. An Unusual Event (UE) was declared, based on a fire of more than 15 minutes in duration within the protected area. The UE was terminated at 2220 hours.

In accordance with 10 CFR 50.72(b)(2)(iv)(B), 10 CFR 50.72(b)(2)(xi), and 10 CFR 50.72(b)(3)(iv)(A), all applicable event (EN #39513) and emergency plan required notifications were completed in a timely manner. The notifications included:

- a one-hour report for emergency plan entry,
- a four-hour report for the automatic reactor protection system (RPS) actuation [JE],
- a four-hour report for offsite notification of an oil spill, and,
- an eight-hour notification for the automatic actuation of an emergency safety features system (auxiliary feedwater) [BA].

The one-hour report was completed at 2105 hours and the remaining three reports were completed by a single notification at 2339 hours.

As such, this LER is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A) for a condition resulting in an automatic actuation of the RPS.

Written notification of the oil spill was transmitted to the NRC via letter AEP:NRC:2401-03, Non-PCB Transformer Oil Spill National Pollution Discharge Elimination System And Groundwater Discharge Authorization Notification.

All safety-related components functioned properly and no significant discrepancies in equipment time responses were noted. The auxiliary feedwater system actuated due to low steam generator levels as expected.

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Cause of Event

The Unit 1 main transformer experienced a sudden internal fault, with no prior indication, that resulted in a phase-to-phase flashover. Donald C. Cook Nuclear Plant (CNP) is conducting a formal root cause investigation into the failure of the Unit 1 main transformer. This root cause investigation is ongoing and includes hardware failure analysis with support from the vendor.

In accordance with the guidance established in NUREG-1022, Revision 2, "Event Reporting Guidelines," Part 5.1.5, "Supplemental Information and Revised LERs," CNP will issue a supplement to this LER when the final root cause determination has been completed.

Analysis of Event

On Wednesday, January 15, 2003, at approximately 2010 hours, a fault occurred in the Unit 1 main transformer. The fault caused the current differential relays to actuate resulting in an automatic trip of the main transformer. A sudden internal fault within the main transformer ruptured the transformer tank and resulted in a loss of oil and a fire. The transformer yard fire protection system actuated as designed and extinguished the fire. The main transformer and main generator protection circuitry performed as designed and the appropriate reactor protection and safeguards equipment functioned correctly. The reactor was shut down and the unit stabilized in Mode 3 as designed with all normal and emergency cooling systems available. This event did not adversely impact the plant's ability to mitigate the consequences of an accident and, therefore, had minimal safety significance.

The change in risk with respect to core damage and large early release frequency as a result of the transformer failure and subsequent plant trip have been qualitatively assessed and judged no different than any other unplanned reactor trips with the main condenser available. This assessment is based on the following considerations:

- The automatic plant trip functioned properly. The automatic trip features also functioned dependably, resulting in a safe and stable plant configuration.
- Transformer fires are well understood and the plant design features include an installed fire suppression system and the dividing walls (concrete and steel) to mitigate the consequences of the fire. Additionally, the transformer is located outside the plant structures, away from any risk-significant equipment, and does not have an effect on any safety function. Therefore, the fire did not degrade any system used to prevent core damage, assure containment integrity, or maintain defense-in-depth and safety margins.

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17. TEXT (If more space is required, use additional copies of NRC Form (366A))

- The subsequent fire suppression water and oil run-offs did not challenge any accident mitigation function. In addition, the main transformer does not provide any accident mitigation capability, nor is it modeled in CNP's Probabilistic Risk Assessment.
- The transformer failure does not directly contribute to the increased likelihood of any initiators, other than transients that result in a reactor trip. Additionally, this event did not have an effect on the function of any emergency diesel generator.

Corrective Actions

Corrective actions included replacement of the main transformer and repair and/or replacement of other non-safety related components damaged by the fire.

Previous Similar Events

In 1995 with Unit 1 shut down, the main transformer experienced a high side (345kv) phase to ground and phase to bushing fault while back energized from the switchyard. The fault did not result in a unit trip, unit transient, or emergency safety features actuation.